

Friday 21 October 2022

1



Gerbils

1

LO-3.1.1

2

Gerbils - introduction

- >100 species
- Originate from Africa and Asia - desert rats
 - adapted to dry habitats.
- Gerbils have been used in research since the 1950s, but are no longer common.
- Mongolian gerbil, *Meriones unguiculatus*.
- Hardy and easy to keep.



2

LO-3.1.1

3

Basic biology

- 110–135 mm long, with a tail approximately 95–120 long.
- Adults weigh 60–130 g, males > females.
- Commonly agouti with a cream belly, black or spotted. (NB: 'spotted' gene is dominant and lethal if homozygous).
- Both sexes have scent gland on belly – more prominent in males
- Research uses - stroke and seizures. Seizure-prone and seizure-resistant strains available.



3

LO-3.1.1

4

Behaviour

- Crepuscular, but diurnal in the laboratory.
- Docile and easy to handle.
- Active, and curious – do not hide if exposed.
- Social – keep in compatible groups.
 - Breeding pair with offspring, or a same-sex group.
- Establish stable groups by mixing at weaning or by 7–8 weeks.
- Normal social behaviour - animals wrestle and groom each other.
- Unfamiliar adults can be aggressive,
 - Can use a perforated divider in the tank for 5–7 days before mixing them. Separate if aggression seen.

4

LO: 4.1 & 4.2

5

Housing

- Gerbils need**
 - If not, normal behaviour stereotypy
 - Provide a burrow. opportunity to
- Gerbils need**
 - Give e.g. nesting material
 - Also make a nest
 - Housing of suitable.
- Gerbils can**
 - They need strong cages.
 - Prefer solid floors, and need at least 2 cm bedding. Do not use sawdust made from pine – matted fur or sore noses.



5

LO: 4.1 & 4.2

6

Housing ctd

- Need at least 15 cm space between the bedding and the roof of the cage, as they like to sit erect.



- Produce very little urine, faecal pellets are small and hard. They are very clean and have minimal odour.

6

Environmental enrichment

- Care should be taken when exposing gerbils to novelty due to their predisposition to suffer stress-induced seizures. However appropriate environmental enrichment is essential for the healthy development and their wellbeing.
- Can develop stereotypic digging behaviour, unless you provide them with adequate facilities to dig.
- They will require a thick layer of litter for digging and nesting and/or a burrow substitute. (5 cm diameter)
- [Housing and husbandry: Gerbil | NC3Rs](#)



7

Feeding

- Omnivorous, hoarding rodents, eat a variety of foodstuffs (plant matter, seeds, tubers, bulbs, roots, seeds and insects)
- Eating is spread throughout the day and night.
- In the wild they gather and store food in the summer to last them through the winter. May stay underground throughout winter, living on their food stores.
- Coprophagic.
- Standard rodent diets with 22% protein.
- Dietary fat < 4% recommended, to prevent obesity and high blood cholesterol.
- Need very little drinking water, resistant to water loss.

9

Breeding

Breeding terms	Gerbil
Sexually mature	42 days
Age at first mating	65 – 85 days (F) 70 – 85 days (M)
Gestation period	24 -26 days (27 – 48 if lactating)
Average litter size	3 - 7
Birth weight	2.5g
Weaning age	21- 24 days (14 -18g)
Oestrus cycle	4 - 6 Days
Post partum oestrus	Fertile



11

Environment conditions

Condition	Recommendation
Air	Need to maintain suitable air quality, and air flow rates may differ depending on housing situation. 15-20 is usually sufficient for a fully stocked room but where stocking density is low 8-10
Temperature	20 - 24°C
Humidity	35 – 50% Gerbils (High humidity causes matted fur)
Lighting	350 – 400 lux at bench gerbils prefer a partially darkened cage
Photoperiod	12 – 12 photoperiod
sound	Sensitive to ultrasound Over 20KHz problematic Gerbils don't like sudden noises can induce seizures

8

Breeding

- Breed all year round in the laboratory,
 - less-efficient than other rodents.
- If a long-time partner dies, the remaining partner may not breed again.
- Puberty from 6 weeks of age, usually breed from 9–12 weeks.
- Pair male and female between 60 and 90 days of age, and never separate them: if they are separated then reintroduced, they may fight.
- Alternatively, harem system, with two or more females grouped with a single male.
- Neonatal mortality is high, up to 20%.
- Pups are born blind, deaf and hairless.
 - Hair from 5 to 7 days, ears open 12–14 days, teeth erupt from 10 to 16 days and eyes open from 16 to 20 days.
- Pups eat solid food from 16 days, wean at 14–18 g (approx 21 days)



10

Handling and restraint

Must cause minimal stress to animal – good welfare
- good science

Should prevent injury to handler - Health and Safety
- accident books
- RIDDOR



12

LO: 4.7 & 7.1 & 7.2

13

Handling

- Use techniques for small rats.
- They readily run into a tube, or may be picked up in cupped hands.
- DO NOT LIFT BY TAIL - support body immediately, if hold tip of tail the skin may slip off.

13

LO: 5.2

14

Pain and stress recognition

- Healthy gerbils are inquisitive and active
- Signs of distress:
 - Weight loss
 - Piloerection
 - Scruffy coat
 - Hunched posture.
 - Ocular discharges and
 - Diarrhoea or constipation
 - Changes in behaviour
 - increased aggression or depression
 - increased respiratory rate

14

LO: 5.2

15

Common diseases and health monitoring

- Few clinical diseases.
 - Tyzzer's disease, fatal enteric infection.
 - They can carry lymphocytic choriomeningitis and Sendai viruses.
- Between 20 and 50% of gerbils may exhibit seizures.
 - Triggered by fear, handling or a new environment.
 - Animals may occasionally die.
 - Place animal in a warm, dark, quiet place to recover.
 - Frequent handling from an early age will reduce the frequency of seizures.

15

LO: 4.8

16

Identification methods

- Appearance/coat colour
- Ear notching
- Microchips
- Fur & tail marking
- Tattooing
- Ear tags
- Use least severity method



16

LO: 8.1

17

Minor procedures

- Oral dosing – Gavage or food/water or tablets/paste
- Subcutaneous – between shoulder blades
- Intraperitoneal – left/right lower quadrant of abdomen
- Intramuscular – hind limb
- I.V. dosing or blood sampling!
 - Tail vein
 - Saphenous vein

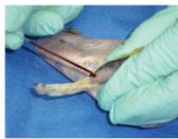


FIGURE 2 | Blood collection by capillary action into a capillary tube after lateral saphenous vein venipuncture in an unanesthetized gerbil.

17

LO: 8.1

18

Anaesthesia

- Important considerations
 - Acclimatisation
 - Minimum 7 days
 - Ensure the animal is healthy
 - Disease
 - Respiratory & cardiovascular systems
 - Body weight
 - Record card
 - Pre-anaesthetic fasting
 - Unnecessary: They can't vomit & become hypoglycaemic
- Minimise stress
 - Good handling supported by appropriate training is essential

18

LO: 8.1

19

Rodent anaesthesia

- Anaesthetic protocol - Consult NVS
 - Injectable agents
 - Choice of drugs (e.g. ketamine + sedative)
 - Route of administration (iv, ip, im, subcut)
 - Inhalation anaesthesia (current best practice) e.g. Isoflurane
 - Inhalation chamber (induction)
 - Face mask (maintenance)
 - Monitor physiological stability
 - Recovery: Continue care & monitoring
- Analgesia e.g. buprenorphine (opioid), Meloxicam (NSAID)

19

LO: 1.12

20

Euthanasia

- Schedule 1
 - Post-natal animals
 - Overdose of anaesthetic
 - Exposure to CO₂ - up to 1.5kg, not neonates
 - Dislocation up to 500g – care: most adults will be larger than this
 - Concussion up to 1kg
 - Fetuses
 - Overdose of anaesthetic
 - Cooling followed by immersion in fixative
 - Decapitation
- Good handling essential
- Must follow by confirmation of death

20

Friday 21 October 2022

21



21